

Building Site Development
Ransom County, North Dakota

Soil properties influence the development of building sites, including the selection of the site, the design of the structure, construction, performance after construction, and maintenance. The following tables show the degree and kind of soil limitations that affect dwellings with and without basements, small commercial buildings, local roads and streets, shallow excavations, and lawns and landscaping.

Rating class terms indicate the extent to which the soils are limited by all of the soil features that affect building site development. Not limited indicates that the soil has features that are very favorable for the specified use. Good performance and very low maintenance can be expected. Slight indicates that the soil has features that are favorable for the specified use. The limitations are minor and can be easily overcome. Good performance and low maintenance can be expected. Moderate indicates that the soil has features that are moderately favorable for the specified use. The limitations can be overcome or minimized by special planning, design, or installation. Fair performance and moderate maintenance can be expected. Severe indicates that the soil has one or more features that are unfavorable for the specified use. The limitations generally cannot be overcome without major soil reclamation, special design, or expensive installation procedures. Poor performance and high maintenance can be expected.

Dwellings are single-family houses of three stories or less. For dwellings without basements, the foundation is assumed to consist of spread footings of reinforced concrete built on undisturbed soil at a depth of 2 feet or at the depth of maximum frost penetration, whichever is deeper. For dwellings with basements, the foundation is assumed to consist of spread footings of reinforced concrete built on undisturbed soil at a depth of about 7 feet. The ratings for dwellings are based on the soil properties that affect the capacity of the soil to support a load without movement and on the properties that affect excavation and construction costs. The properties that affect the load-supporting capacity include depth to a water table, ponding, flooding, subsidence, linear extensibility (shrink-swell potential), and compressibility. Compressibility is inferred from the Unified classification. The properties that affect the ease and amount of excavation include depth to a water table, ponding, flooding, slope, depth to bedrock or a cemented pan, hardness of bedrock or a cemented pan, and the amount and size of rock fragments.

Small commercial buildings are structures that are less than three stories high and do not have basements. The foundation is assumed to consist of spread footings of reinforced concrete built on undisturbed soil at a depth of 2 feet or at the depth of maximum frost penetration, whichever is deeper. The ratings are based on the soil properties that affect the capacity of the soil to support a load without movement and on the properties that affect excavation and construction costs. The properties that affect the load-supporting capacity include depth to a water table, ponding, flooding, subsidence, linear extensibility (shrink-swell potential), and compressibility (which is inferred from the Unified classification). The properties that affect the ease and amount of excavation include flooding, depth to a water table, ponding, slope, depth to bedrock or a cemented pan, hardness of bedrock or a cemented pan, and the amount and size of rock fragments.

Local roads and streets have an all-weather surface and carry automobile and light truck traffic all year. They have a subgrade of cut or fill soil material; a base of gravel, crushed rock, or soil material stabilized by lime or cement; and a surface of flexible material (asphalt), rigid material (concrete), or gravel with a binder. The ratings are based on the soil properties that affect the ease of excavation and grading and the traffic-supporting capacity. The properties that affect the ease of excavation and grading are depth to bedrock or a cemented pan, hardness of bedrock or a cemented pan, depth to a water table, ponding, flooding, the amount of large stones, and slope. The properties that affect the traffic-supporting capacity are soil strength (as inferred from the AASHTO group index number), subsidence, linear extensibility (shrink-swell potential), the potential for frost action, depth to a water table, and ponding.

Shallow excavations are trenches or holes dug to a maximum depth of 5 or 6 feet for graves, utility lines, open ditches, or other purposes. The ratings are based on the soil properties that influence the ease of digging and the resistance to sloughing. Depth to bedrock or a cemented pan, hardness of bedrock or a cemented pan, the amount of large stones, and dense layers influence the ease of digging, filling, and compacting. Depth to the seasonal high water table, flooding, and ponding may restrict the period when excavations can be made. Slope influences the ease of using machinery. Soil texture, depth to the water table, and linear extensibility (shrink-swell potential) influence the resistance to sloughing.

Lawns and landscaping require soils on which turf and ornamental trees and shrubs can be established and maintained. Irrigation is not considered in the ratings. The ratings are based on the soil properties that affect plant growth and trafficability after vegetation is established. The properties that affect plant growth are reaction; depth to a water table; ponding; depth to bedrock or a cemented pan; the available water capacity in the upper 40 inches; the content of salts, sodium, or calcium carbonate; and sulfidic materials. The properties that affect trafficability are flooding, depth to a water table, ponding, slope, stoniness, and the amount of sand, clay, or organic matter in the surface layer.

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Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
64: Arveson-----	Severe: wetness cutbanks cave	Severe: wetness	Severe: wetness	Severe: wetness	Severe: frost action wetness	Severe: wetness
76: Arvilla-----	Severe: cutbanks cave	Slight	Slight	Slight	Slight	Moderate: droughty
86: Aylmer-----	Severe: wetness cutbanks cave	Moderate: wetness	Severe: wetness	Moderate: wetness	Moderate: wetness	Moderate: wetness droughty
Bantry-----	Severe: wetness cutbanks cave	Severe: wetness	Severe: wetness	Severe: wetness	Moderate: wetness	Moderate: wetness droughty
118: Barnes-----	Slight	Moderate: shrink-swell	Moderate: shrink-swell	Moderate: shrink-swell slope	Severe: low strength	Slight
Buse-----	Slight	Moderate: shrink-swell	Moderate: shrink-swell	Moderate: shrink-swell slope	Severe: low strength	Slight
120: Barnes-----	Slight	Moderate: shrink-swell	Moderate: shrink-swell	Moderate: shrink-swell slope	Severe: low strength	Slight
Buse-----	Slight	Moderate: shrink-swell	Moderate: shrink-swell	Moderate: shrink-swell slope	Severe: low strength	Slight
154: Barnes-----	Slight	Moderate: shrink-swell	Moderate: shrink-swell	Moderate: shrink-swell slope	Severe: low strength	Slight
Svea-----	Moderate: wetness	Moderate: shrink-swell	Moderate: shrink-swell wetness	Moderate: shrink-swell slope	Severe: low strength	Slight
156: Barnes-----	Slight	Moderate: shrink-swell	Moderate: shrink-swell	Moderate: shrink-swell slope	Severe: low strength	Slight
Svea-----	Moderate: wetness	Moderate: shrink-swell	Moderate: shrink-swell wetness	Moderate: shrink-swell slope	Severe: low strength	Slight
314: Buse-----	Moderate: slope	Moderate: shrink-swell slope	Moderate: shrink-swell slope	Severe: slope	Severe: low strength	Moderate: slope
Barnes-----	Slight	Moderate: shrink-swell	Moderate: shrink-swell	Moderate: shrink-swell slope	Severe: low strength	Slight
450: Colvin-----	Severe: wetness	Severe: wetness	Severe: wetness	Severe: wetness	Severe: frost action low strength wetness	Severe: wetness
493: Darnen-----	Severe: excess humus	Severe: low strength	Moderate: shrink-swell	Severe: low strength	Moderate: frost action	Slight
510: Divide-----	Severe: wetness cutbanks cave	Moderate: wetness	Severe: wetness	Moderate: wetness	Moderate: frost action wetness	Moderate: wetness

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571: Embsden-----	Severe: cutbanks cave	Slight	Moderate: wetness	Slight	Moderate: frost action	Slight
726: Fordville-----	Severe: cutbanks cave	Slight	Slight	Slight	Slight	Slight
772: Gardena-----	Moderate: wetness	Slight	Moderate: wetness	Slight	Severe: frost action	Slight
Eckman-----	Slight	Slight	Slight	Slight	Severe: frost action	Slight
794: Glyndon-----	Severe: cutbanks cave	Slight	Moderate: wetness	Slight	Severe: frost action	Moderate: wetness
795: Glyndon, SALINE-----	Severe: wetness cutbanks cave	Moderate: wetness	Severe: wetness	Moderate: wetness	Severe: frost action	Severe: excess salt
852: Hamar-----	Severe: wetness cutbanks cave	Severe: wetness	Severe: wetness	Severe: wetness	Moderate: frost action wetness	Moderate: wetness droughty
883: Hamerly-----	Severe: wetness	Moderate: shrink-swell wetness	Severe: wetness	Moderate: shrink-swell wetness	Severe: frost action	Moderate: wetness
Tonka-----	Severe: ponding	Severe: shrink-swell ponding	Severe: shrink-swell ponding	Severe: shrink-swell ponding	Severe: low strength shrink-swell ponding	Severe: ponding
Parnell-----	Severe: excess humus ponding	Severe: shrink-swell ponding	Severe: shrink-swell ponding	Severe: shrink-swell ponding	Severe: low strength shrink-swell ponding	Severe: ponding
939: Hecle-----	Severe: cutbanks cave	Slight	Moderate: wetness	Slight	Moderate: frost action	Moderate: droughty
Hamar-----	Severe: wetness cutbanks cave	Severe: wetness	Severe: wetness	Severe: wetness	Moderate: frost action wetness	Moderate: wetness droughty
1030: Kranzburg-----	Slight	Moderate: shrink-swell	Moderate: shrink-swell	Moderate: shrink-swell slope	Severe: frost action low strength	Slight
Lismore-----	Moderate: wetness	Moderate: shrink-swell	Moderate: shrink-swell wetness	Moderate: shrink-swell slope	Severe: frost action low strength	Slight
1043: La Prairie-----	Moderate: wetness	Severe: flooding	Severe: flooding	Severe: flooding	Severe: low strength	Slight
1055: Ladelle-----	Moderate: wetness	Severe: flooding	Severe: flooding	Severe: flooding	Severe: frost action low strength	Slight
1081: Lamoure-----	Severe: wetness	Severe: flooding wetness	Severe: flooding wetness	Severe: flooding wetness	Severe: low strength wetness	Severe: wetness

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1168: Lismore-----	Moderate: wetness	Moderate: shrink-swell	Moderate: shrink-swell wetness	Moderate: shrink-swell	Severe: frost action low strength	Slight
Kranzburg-----	Slight	Moderate: shrink-swell	Moderate: shrink-swell	Moderate: shrink-swell	Severe: frost action low strength	Slight
1205: Maddock-----	Severe: cutbanks cave	Moderate: slope	Moderate: slope	Severe: slope	Moderate: slope	Moderate: slope droughty
1221: Maddock-----	Severe: cutbanks cave	Slight	Slight	Slight	Slight	Moderate: droughty
Hecla-----	Severe: cutbanks cave	Slight	Moderate: wetness	Slight	Moderate: frost action	Moderate: droughty
1269: Marysland-----	Severe: wetness cutbanks cave	Severe: wetness	Severe: wetness	Severe: wetness	Severe: frost action wetness	Severe: wetness
1403: Overly-----	Moderate: too clayey wetness	Moderate: shrink-swell	Moderate: shrink-swell wetness	Moderate: shrink-swell	Severe: frost action low strength	Slight
1427: Parnell-----	Severe: excess humus ponding	Severe: shrink-swell ponding	Severe: shrink-swell ponding	Severe: shrink-swell ponding	Severe: low strength shrink-swell ponding	Severe: ponding
1466: Pits, Sand And Gravel---	Severe: slope cutbanks cave	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope small stones droughty
1472: Rauville-----	Severe: wetness cutbanks cave	Severe: flooding wetness	Severe: flooding wetness	Severe: flooding wetness	Severe: flooding low strength wetness	Severe: flooding wetness
1523: Renshaw-----	Severe: cutbanks cave	Slight	Slight	Slight	Slight	Moderate: droughty
1560: Rifle-----	Severe: excess humus ponding	Severe: low strength ponding	Severe: low strength ponding	Severe: low strength ponding	Severe: frost action ponding	Severe: excess humus ponding
1577: Rosewood-----	Severe: wetness cutbanks cave	Severe: wetness	Severe: wetness	Severe: wetness	Severe: frost action wetness	Severe: wetness
1648: Serden-----	Severe: slope cutbanks cave	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope
Duneland-----	Severe: slope cutbanks cave	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope droughty
1670: Ulen-----	Severe: cutbanks cave	Slight	Moderate: wetness	Slight	Moderate: frost action	Moderate: wetness

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Rosewood-----	Severe: wetness cutbanks cave	Severe: wetness	Severe: wetness	Severe: wetness	Severe: frost action wetness	Severe: wetness
1704: Sioux-----	Severe: cutbanks cave	Slight	Slight	Slight	Slight	Severe: droughty
Renshaw-----	Severe: cutbanks cave	Slight	Slight	Slight	Slight	Moderate: droughty
1709: Southam-----	Severe: ponding	Severe: shrink-swell ponding	Severe: shrink-swell ponding	Severe: shrink-swell ponding	Severe: low strength shrink-swell ponding	Severe: ponding
1772: Svea-----	Moderate: wetness	Moderate: shrink-swell	Moderate: shrink-swell wetness	Moderate: shrink-swell slope	Severe: low strength	Slight
Gardena-----	Moderate: wetness	Slight	Moderate: wetness	Slight	Severe: frost action	Slight
1788: Svenoda-----	Moderate: wetness	Slight	Moderate: shrink-swell wetness	Slight	Moderate: frost action	Slight
Barnes-----	Slight	Moderate: shrink-swell	Moderate: shrink-swell	Moderate: shrink-swell slope	Severe: low strength	Slight
1834: Tonka-----	Severe: ponding	Severe: shrink-swell ponding	Severe: shrink-swell ponding	Severe: shrink-swell ponding	Severe: low strength shrink-swell ponding	Severe: ponding
1842: Towner-----	Severe: cutbanks cave	Slight	Moderate: shrink-swell wetness	Slight	Moderate: frost action	Moderate: droughty
1859: Ulen-----	Severe: cutbanks cave	Slight	Moderate: wetness	Slight	Moderate: frost action	Moderate: wetness
1871: Valliers, SALINE-----	Severe: wetness	Severe: wetness	Severe: wetness	Severe: wetness	Severe: frost action low strength wetness	Severe: excess salt wetness
1883: Valliers-----	Severe: wetness	Severe: wetness	Severe: wetness	Severe: wetness	Severe: frost action	Moderate: wetness
Parnell-----	Severe: excess humus ponding	Severe: shrink-swell ponding	Severe: shrink-swell ponding	Severe: shrink-swell ponding	Severe: low strength shrink-swell ponding	Severe: ponding
1935: Venlo-----	Severe: ponding cutbanks cave	Severe: ponding	Severe: ponding	Severe: ponding	Severe: ponding	Severe: ponding
1953: Wahpeton-----	Moderate: flooding too clayey	Severe: flooding shrink-swell	Severe: flooding shrink-swell	Severe: flooding shrink-swell	Severe: flooding low strength shrink-swell	Severe: too clayey
1978: Water-----	---	---	---	---	---	---

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2049: Wyndmere-----	Severe: wetness cutbanks cave	Moderate: wetness	Severe: wetness	Moderate: wetness	Severe: frost action	Moderate: wetness
2091: Zell-----	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: frost action slope	Severe: slope
2206: Barnes-----	Slight	Moderate: shrink-swell	Moderate: shrink-swell	Moderate: shrink-swell slope	Severe: low strength	Slight
Sioux-----	Severe: cutbanks cave	Slight	Slight	Moderate: slope	Slight	Severe: droughty
2207: Bearden-----	Severe: wetness cutbanks cave	Moderate: shrink-swell wetness	Severe: wetness	Moderate: shrink-swell wetness	Severe: frost action low strength	Moderate
2208: Brantford-----	Severe: cutbanks cave	Slight	Slight	Slight	Slight	Moderate: droughty
Coe-----	Severe: cutbanks cave	Slight	Slight	Slight	Slight	Severe: droughty
2209: Buse-----	Moderate: slope	Moderate: shrink-swell slope	Moderate: shrink-swell slope	Severe: slope	Severe: low strength	Moderate: slope
Barnes-----	Slight	Moderate: shrink-swell	Moderate: shrink-swell	Moderate: shrink-swell slope	Severe: low strength	Slight
2210: Cathay, BOULDERY-----	Moderate: large stones wetness	Moderate: large stones shrink-swell	Moderate: large stones shrink-swell wetness	Moderate: large stones shrink-swell	Severe: low strength	Severe: excess sodium large stones
Larson, BOULDERY-----	Moderate: large stones wetness	Moderate: large stones shrink-swell	Moderate: large stones shrink-swell wetness	Moderate: large stones shrink-swell	Severe: low strength	Severe: excess sodium large stones
2211: Eckman-----	Slight	Slight	Slight	Moderate: slope	Severe: frost action	Slight
Gardena-----	Moderate: wetness	Slight	Moderate: wetness	Moderate: slope	Severe: frost action	Slight
2212: Eckman-----	Slight	Slight	Slight	Moderate: slope	Severe: frost action	Slight
Zell-----	Slight	Slight	Slight	Moderate: slope	Severe: frost action	Slight
2213: Eckman-----	Slight	Slight	Slight	Moderate: slope	Severe: frost action	Slight
Zell-----	Slight	Slight	Slight	Moderate: slope	Severe: frost action	Slight
2214: Exline-----	Severe: wetness cutbanks cave	Severe: shrink-swell	Severe: wetness	Severe: shrink-swell	Severe: low strength shrink-swell	Severe: excess sodium

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2215: Fairdale-----	Moderate: wetness	Severe: flooding	Severe: flooding	Severe: flooding	Moderate: flooding low strength shrink-swell	Slight
2216: Gwinner-----	Moderate: too clayey wetness	Moderate: shrink-swell	Moderate: shrink-swell wetness	Moderate: shrink-swell	Severe: frost action	Slight
Peever-----	Moderate: too clayey	Severe: shrink-swell	Severe: shrink-swell	Severe: shrink-swell	Severe: low strength shrink-swell	Slight
Parnell-----	Severe: excess humus ponding	Severe: shrink-swell ponding	Severe: shrink-swell ponding	Severe: shrink-swell ponding	Severe: low strength shrink-swell ponding	Severe: ponding
2217: Hamerly-----	Severe: wetness	Moderate: shrink-swell wetness	Severe: wetness	Moderate: shrink-swell wetness	Severe: frost action	Moderate: wetness
Buse-----	Slight	Moderate: shrink-swell	Moderate: shrink-swell	Moderate: shrink-swell slope	Severe: low strength	Slight
Parnell-----	Severe: excess humus ponding	Severe: shrink-swell ponding	Severe: shrink-swell ponding	Severe: shrink-swell ponding	Severe: low strength shrink-swell ponding	Severe: ponding
2218: Brantford-----	Severe: cutbanks cave	Slight	Slight	Slight	Slight	Moderate: droughty
Vang-----	Severe: cutbanks cave	Slight	Moderate: wetness	Slight	Moderate: frost action	Slight
2219: Hegne-----	Severe: wetness cutbanks cave	Severe: shrink-swell wetness	Severe: shrink-swell wetness	Severe: shrink-swell wetness	Severe: low strength shrink-swell wetness	Severe: wetness
2220: Letcher-----	Moderate: wetness	Slight	Moderate: wetness	Slight	Moderate: frost action	Severe: excess sodium
Lemert-----	Severe: cutbanks cave	Slight	Moderate: wetness	Slight	Moderate: frost action	Severe: excess sodium
2221: Falsen-----	Severe: cutbanks cave	Slight	Moderate: wetness	Slight	Slight	Moderate: droughty
2222: Peever-----	Moderate: too clayey	Severe: shrink-swell	Severe: shrink-swell	Severe: shrink-swell	Severe: low strength shrink-swell	Slight
Gwinner-----	Moderate: too clayey wetness	Moderate: shrink-swell	Moderate: shrink-swell wetness	Moderate: shrink-swell slope	Severe: frost action	Slight
2223: Renshaw-----	Severe: cutbanks cave	Slight	Slight	Slight	Slight	Moderate: droughty
Sioux-----	Severe: cutbanks cave	Slight	Slight	Slight	Slight	Severe: droughty

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2224: Serden-----	Severe: cutbanks cave	Moderate: slope	Moderate: slope	Severe: slope	Moderate: slope	Moderate: slope droughty
Hamar-----	Severe: wetness cutbanks cave	Severe: wetness	Severe: wetness	Severe: wetness	Moderate: frost action wetness	Moderate: wetness droughty
2225: Sioux-----	Severe: cutbanks cave	Moderate: large stones slope	Moderate: large stones slope	Severe: slope	Moderate: large stones slope	Severe: large stones droughty
2226: Stirum-----	Severe: ponding cutbanks cave	Severe: ponding	Severe: ponding	Severe: ponding	Severe: ponding	Severe: excess sodium wetness
Lemert-----	Severe: cutbanks cave	Slight	Moderate: wetness	Slight	Moderate: frost action	Severe: excess sodium
2228: Aylmer-----	Severe: wetness cutbanks cave	Moderate: wetness	Severe: wetness	Moderate: wetness	Moderate: wetness	Moderate: wetness droughty
Rosewood-----	Severe: wetness cutbanks cave	Severe: wetness	Severe: wetness	Severe: wetness	Severe: frost action wetness	Severe: wetness
Serden-----	Severe: cutbanks cave	Slight	Slight	Moderate: slope	Slight	Moderate: droughty

